

Work Order ID 59331

Tuesday, June 01, 2010 11:46:08 AM

Page 1

Item ID: D350-748-141TRN

Accept

Revision ID:

Item Name: Crosstube Turning Detail

Start Date: 6/1/2010 Start Qty: 1.00

Required Date: 6/8/2010 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA648
2-Turn first side as per Folio FA648
3- File transition lines smooth.

Q.M 10-06-02

110

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

Q.M 10-06-02

120

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA648
2- File transition lines smooth.
3-Scribe Part & Batch as per Dwg D350-748-141

Q.M 10-06-02

W/O:		WORK ORDER CHANGES						
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: * _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

[illegible]

Page 2

Accept

**Setup Start**

Stop

[illegible]

Cust Item ID:

Abstract

Customer:

Reference:

Run Start

Stop

**Insp.
Stamp**

0.00

00000000000000000000

QC

Memo

0.00

Quality Control

140

0.00

QC

Memo

0.00

Quality Control

150

0.00

1000

Crosstubes

Memo

0.00

Crosstubes

Grind machining marks

C.N 10-06-02 (1)

IX 2 MB 10-06-03

1 - - AWM
10-05-07

W/O:		WORK ORDER CHANGES					
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Page 3

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Reference:

Cust Item ID:

Customer:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

160

Outsource process - Heat Treat

0.00



Outsource1

Memo

0.00

Outsource process - Heat Treat

Issue P/O: 12209
Heat Treat to min 180 KSI As per Dwg D350-748-141
(MIL-T-6736 OR AMS 2759-1C)
Sand Blast tube after Heat Treat
Possible Supplier: Vac Aero
Ensure Certificate of Conformity is attached

CL 10/7/00 (1)

170

Receive & Inspect for Damage & Mat'l Certs

0.00



Packaging

Memo

0.00

Packaging

Ensure certificate of conformaty is attached

CL 10/7/22 (1)

180

QC6- Inspect dimensions to drawing

0.00



QC

Memo

0.00

Quality Control

S 10/6/23

(1)

Dart Aerospace Ltd

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Page 4

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Reference:

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

0.00



Packaging

Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack
Location: 46

DP 10-8-5

200

0.00



QC

QC21- Final Inspection - Work Order Release

Memo

0.00

Quality Control

10/08/05

MF

10-8-05

Dart Aerospace Ltd

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NOTE: Date & initial all entries

Picklist Print

Tuesday, June 01, 2010 11:46:14 AM

Page 1

Work Order ID: 59331



Parent Item: D350-748-141TRN



Parent Item Name: Crosstube Turning Detail

Start Date: 6/1/2010

Required Date: 6/8/2010

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
 IPP Rev B Removed polish 08.04.02 EC verified by : DD
 IPP Rev C Remove LPS-3 08.06.23 EC verified by DD

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Qty per Kit	Total	Qty	Date	Status
D6017-115		Manufactured	No			110	Each	26.0000	1	1			



Crosstube Material



Q.m 10-06-02

Location

Loc Qty

Loc Code

LG

26

32912

26

1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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DART AEROSPACE LTD	Work Order:	59331
Description: Crosstube Assembly (AS350/355 High Fwd)	Part Number:	D350-748-141
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet	Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.242	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.185	/			
	2.237	+0.005/-0.000	2.242	/			
	2.272	+0.005/-0.000	2.277	/			
	2.306	+0.005/-0.000	2.311	/			
	2.339	+0.005/-0.000	2.339	/			
	2.339	+0.005/-0.000	2.339	/			
	0.062	+/-0.010	0.062	/			
	4.26	+/-0.030	4.260	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.500	/			
SIDE B	2.240	+0.005/-0.000	2.242	/			
	2.180	+0.005/-0.000	2.185	/			
	2.180	+0.005/-0.000	2.185	/			
	2.237	+0.005/-0.000	2.242	/			
	2.272	+0.005/-0.000	2.277	/			
	2.306	+0.005/-0.000	2.311	/			
	2.339	+0.005/-0.000	2.339	/			
	2.339	+0.005/-0.000	2.339	/			
	0.062	+/-0.010	0.062	/			
	4.26	+/-0.030	4.260	/			
	R0.063	+/-0.010	R0.063	/			
	R0.50	+/-0.030	R0.500	/			
	110.27	+/-0.060	110.270	/			

Measured by:	Q11	Audited by:	MB	Prototype Approval:	N/A
Date:	10.06.02	Date:	10-06-03	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	

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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CAODIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 30.45 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

STANDARD
PARTS TO
ENTERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITH NOTICE
WORK ORDER
NO. 59331

10-6-01

RELEASED
2009-10-29

E	REVISE GENERAL NOTES: UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	08.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. E
CHECKED	RF	D350-748-141	SHEET 1 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

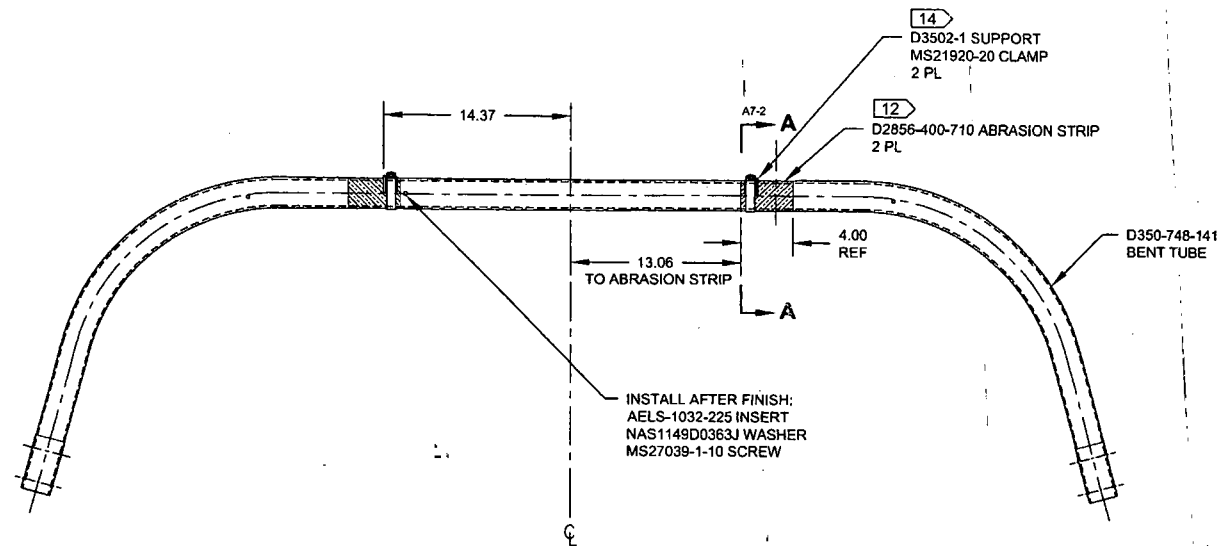
W/O:		WORK ORDER CHANGES					
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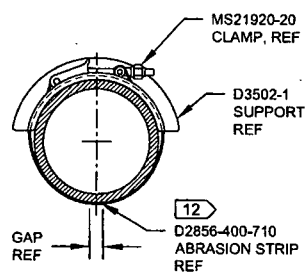
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

RELEASED
2009-10-29

DESIGN	90	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. E
MFG. APPR.	18	D350-748-141	SHEET 2 OF 4
APPROVED	18	TITLE	SCALE
DE APPR.	18	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2008 BY DART AEROSPACE LTD	
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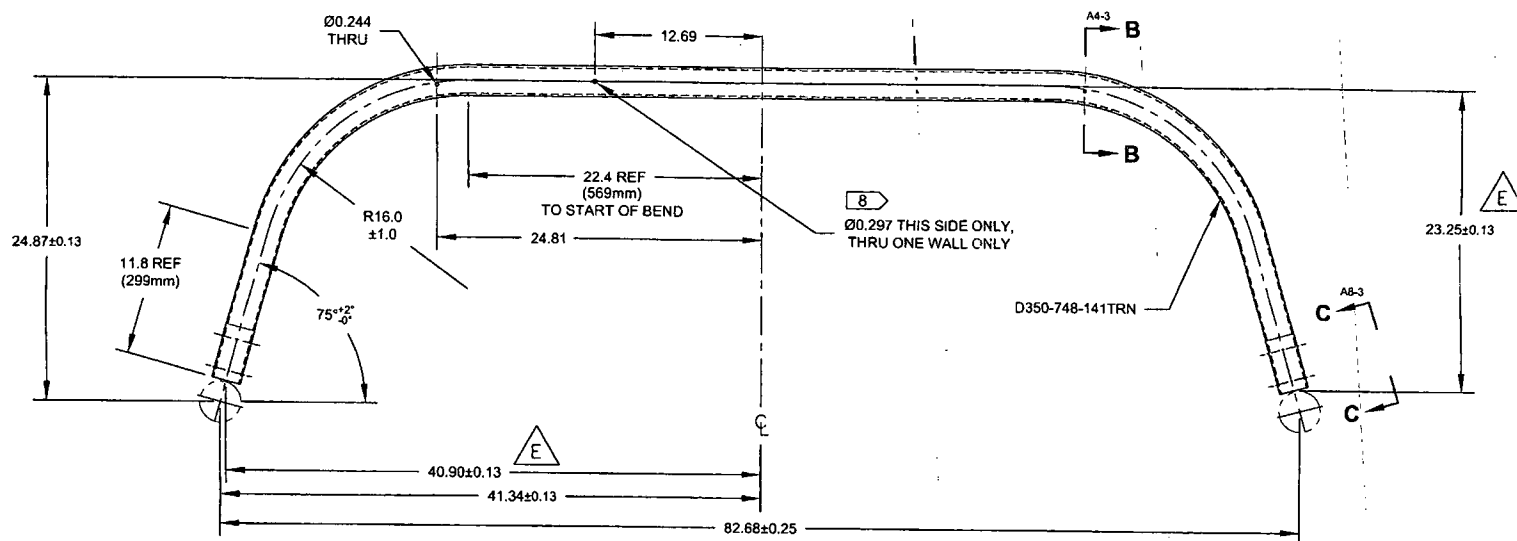
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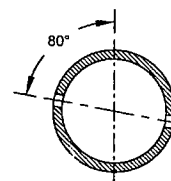
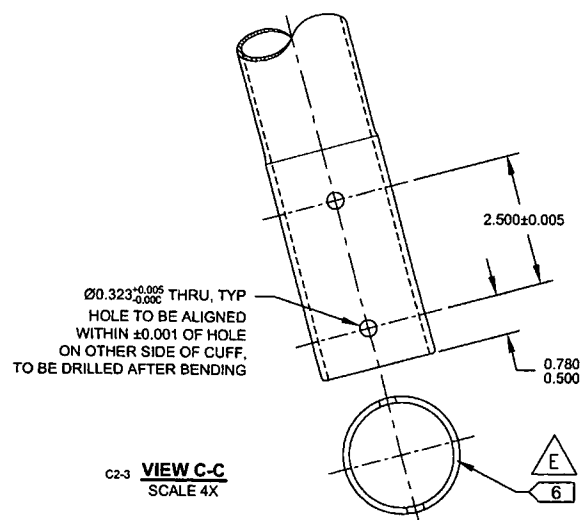
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D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
SCALE 4X

W/0 59331

RELEASED
2009-10-23

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. E
MFG. APPR.	97	D350-748-141	SHEET 3 OF 4
APPROVED	97	TITLE	SCALE
DE APPR.	97	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD	
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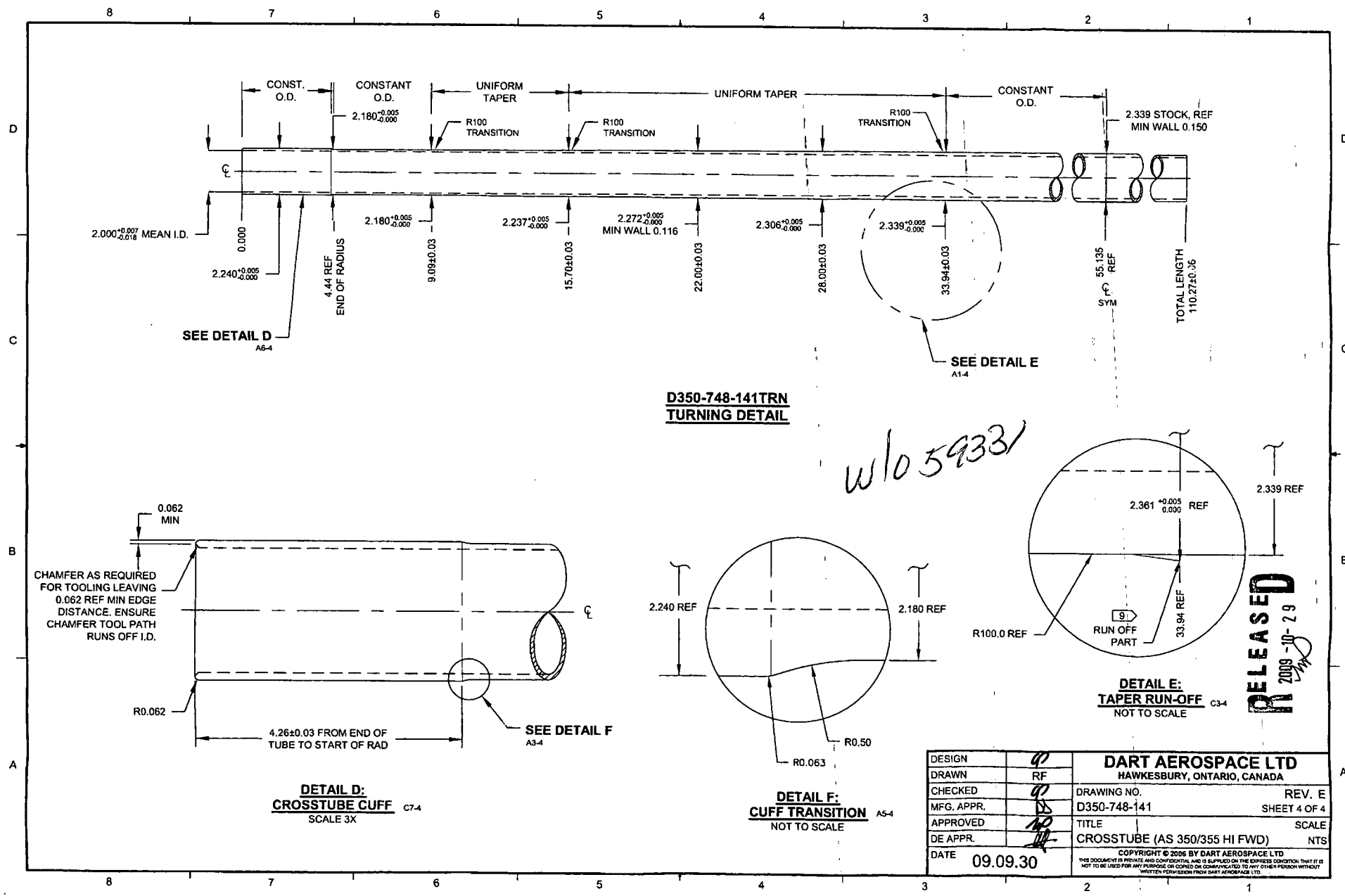
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VAC AERO

INTERNATIONAL INC.

RELEASE NOTE

GST No.: R105468102

OAK 121151-1



HEAD OFFICE

1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B

OAKVILLE, ONTARIO
CANADA L6L 6J4

TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION

7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5

TEL: (514) 334-4240 FAX: (514) 334-6269

07/16/2010

MM / DD / YYYY

PAGE: 1

1DAR01

ILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
07/16/2010		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO12209		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	CROSS TUBE	EA	16	16	
<p>Process Specifications: Procedure: 4353 HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1E 100% HARDNESS TESTED AS PER ASTM E-18, 40-45 HRC MATERIAL: 4130 SAND BLASTED AFTER HEAT TREAT</p> <p>P/N: D350-748-141: 59325, 59326, 59327, 59328, 59329, 59330, 59331, 59332. P/N: D350-748-241: 59586, 59588, 59589, 59549, 59587, 59550, 59551, 59552</p> <p>100% HARDNESS TESTED 16 pcs 42/43 HRC</p> <p>VA.I.O. TH. 25 Q.C.</p>					

hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant hereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.



METAL TREATING INSTITUTE

Jane Robinson
Authorized Q.C. Inspector



Heat Treating • Welding

VACUUM BRAZING • HEAT TREATING • SPECIAL PROCESSING • FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL • PLASMA AND OTHER COATINGS